

## RESUME

*Robert M. Geist III*

### CONTACT INFORMATION:

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### EDUCATION:

Mathematics:

Ph.D., University of Notre Dame, 5/74  
M.S., University of Notre Dame, 1/73  
B.A., Duke University, 6/70

Computer Science:

M.A., Duke University, 12/80

### HONORS AND AWARDS:

B.A. degree Summa Cum Laude  
Phi Beta Kappa, Pi Mu Epsilon, Phi Eta Sigma, Sigma Xi  
IFIP WG 7.3, Computer Performance Modeling and Analysis  
Julia Dale Prize in Mathematics, 1970  
Best Paper, 2<sup>nd</sup> Government Neural Networks Applications Workshop, 1991  
Highest-rated Paper, 30<sup>th</sup> ACM Southeast Conf., 1992  
Sigma Xi Award for Excellence in Research, 1994  
Faculty Award of Excellence for Achievement in the Sciences, 1997  
National Scholars Award of Distinction, 2005  
Best Paper (Günther Enderle Award), Eurographics, 2005

### PUBLICATIONS: (selected subset)

1. Geist, R., Hicks, J., Smotherman, M., and Westall, J., "Parallel Simulation of Petri Nets on Desktop PC Hardware," *Proc. of the 2005 Winter Simulation Conf. (WSC 2005)*, Orlando, Florida, December, 2005, pp. 374-383.
2. Rasche, K., Geist, R., and Westall, J., "Re-Coloring Images for Gamuts of Lower Dimension," *Computer Graphics Forum* **24:3** (2005), pp. 423-432, *Award: Best Paper, Eurographics 05*.
3. Rasche, K., Geist, R., and Westall, J., "Detail Preserving Reproduction of Color Images for Monochromats and Dichromats," *IEEE Computer Graphics & Applications*, Special Issue on Smart Depiction for Visual Communication **25:3** (2005), pp. 22-30.

4. Gairing, M., Geist, R., Hedetniemi, S., and Kristiansen, P., "A Self-Stabilizing Algorithm for Maximal 2-Packing," *Nordic Journal of Computing*, **11**:1 (2004), pp. 1 - 11.
5. Geist, R., Rasche, K., Westall, J., and Schalkoff, R., "Lattice-Boltzmann Lighting," *Rendering Techniques 2004 (Proc. Eurographics Symposium on Rendering)*, Norrköping, Sweden, June, 2004, pp. 355 - 362, 423.
6. Davis, T., Geist, R., Matzko, S., and Westall, J., "τέχνη: A First Step," *ACM SIGCSE Bulletin*, **36**:1 (2004), pp. 125 - 129; also appears in: *Proc. of the ACM SIGCSE Technical Symp. on Computer Science Education (SIGCSE 2004)*, Norfolk, Virginia, March, 2004.
7. Geist, R., and Westall, J., "Correlational and Distributional Effects in Network Traffic Models," *Performance Evaluation*, **44** (2001), pp. 121 - 138.
8. Danforth, R., and Geist, R., "Automatic Mesh Refinement and Its Application to Radiosity Computations," *Int. Journal of Robotics and Automation* **15**:1 (2000), Acta Press, pp. 1 - 8.
9. Danforth, R., Duchowski, A., Geist, R., and McAliley, E., "A Platform for Gaze-Contingent Virtual Environments," *Proc. of the AAAI Smart Graphics Symp.*, Stanford, California, March, 2000, pp. 66 - 70.
10. Geist, R., Vernon, D., and Schalkoff, R., "Rendering Inversion in the Automated Construction of Virtual Environments," *Proc. 3<sup>rd</sup> ASCE Specialty Conf. on Robotics for Challenging Environments (ROBOTICS '98)*, Albuquerque, New Mexico, April, 1998, pp. 85 - 91.
11. Geist, R., "Four-Stage Model for Predicting Creep Behavior," *ASCE Journal of Engineering Mechanics*, **124**:1(1998) pp. 118 - 120.
12. Geist, R., Schalkoff, R., Stinson, T., and Gurbuz, S., "Autonomous Virtualization of Real Environments for Telepresence Applications," *PRESENCE: Teleoperators and Virtual Environments*, **6**:6(1997), MIT Press, pp. 645 - 657.
13. Geist, R., "Performance Bounds for Modeling NUMA Architectures," *Information Processing Letters*, **63**:2(1997), pp. 113 - 117.
14. Geist, R., and Westall, J., "Performance and Availability Evaluation of NUMA Architectures," *Proc. of the IEEE Int. Computer Performance and Dependability Symp. (IPDS '96)*, Urbana, Illinois, September, 1996, pp. 271 - 280.
15. Geist, R., Junkins, S., and Heim, O., "Color Representation in Virtual Environments," *Color Research and Application*, **21** (1996) pp. 121 - 128; abstract also appears in: *Proc. 1<sup>st</sup> ISCC Pan-Chromatic Conf.*, Williamsburg, Virginia, February, 1995, p. 35.
16. Geist, R., and Westall, J., "Disk Scheduling in Linux," *Proc. of the 20<sup>th</sup> Annual Int. Conf. of the Computer Measurement Group (CMG94)*, Orlando, Florida, December, 1994, pp. 739-746.
17. Geist, R., Crane, D., Daniel, S. and Suggs, D., "Systems Modeling with Xpetri," *Proc. 1994 Winter Simulation Conf. (WSC '94)*, Orlando, Florida, December, 1994, pp. 611-618.
18. Tomek, L., Mainkar, V., Geist, R., and Trivedi, K., "Reliability Modeling of Life-Critical, Real-Time Systems," *Proceedings of the IEEE*, **82** (1994), pp. 108-121.

19. Geist, R., Suggs, D., and Reynolds, R., "Minimizing Mean Seek Distance in Mirrored Disk Systems by Cylinder Remapping," *Performance Evaluation*, **20** (1994), pp. 97-114; also appears in: *Proc. of the 16<sup>th</sup> IFIP Int. Symposium on Computer Performance Modeling, Measurement, and Evaluation (PERFORMANCE '93)*, Rome, Italy, September, 1993, pp. 91-108.
20. Geist, R., and Trivedi, K., "An Analytic Treatment of the Performance and Reliability of Mirrored Disk Subsystems," *Proc. of the 23<sup>rd</sup> IEEE Int. Symp. on Fault-Tolerant Computing (FTCS-23)*, Toulouse, France, June, 1993, pp. 442-450.
21. Geist, R., Reynolds, R., and Suggs, D., "A Markovian Framework for Digital Halftoning," *ACM Trans. on Graphics*, **12**(1993), pp. 136-159.
22. Geist, R., and Suggs, D., "Neural Networks for the Design of Distributed, Fault-Tolerant, Computing Environments," *Proc. of the 11<sup>th</sup> IEEE Symp. on Reliable Distributed Systems*, Houston, Texas, October, 1992, pp. 189-195.
23. Geist, R., Suggs, D., Reynolds, R., Divatia, S., Harris, F., Foster, E., and Kolte, P., "Disk Performance Enhancement through Markov-based Cylinder Remapping," *Proc. of the 30<sup>th</sup> Annual ACM Southeast Conf.*, Raleigh, North Carolina, April, 1992, pp. 23-28. (*Highest-rated Paper*)
24. Geist, R., Offutt, A. J., and Harris, F., "Estimation and Enhancement of Real-Time Software Reliability through Mutation Analysis," *IEEE Trans. on Comp., Special Issue on Fault-Tolerant Computing*, **41** (1992), pp. 550-558.
25. Geist, R., "Neural Networks for Visual Quantization Encoding," *Proc. of the 2<sup>nd</sup> Government Neural Network Applications Workshop*, Huntsville, Alabama, September, 1991. *Award: Best Paper*
26. Geist, R., "Extended Behavioral Decomposition for Estimating Ultrahigh Reliability," *IEEE Trans. on Reliab.*, **40** (1991), pp. 22-28.
27. Geist, R., and Trivedi, K., "Reliability Estimation of Fault-Tolerant Systems: Tools and Techniques," *IEEE Computer, Special Issue on Fault-Tolerant Computing*, **23** (1990), pp. 52-61; also appears in: Suri, N., Walter, C., and Hugue, M. *Advances in Ultra-Dependable Distributed Systems*, IEEE Comp. Soc. Press, Los Alamitos, California, 1994.
28. Geist, R., Smotherman, M., and Talley, R., "Modeling Recovery Time Distributions in Fault-Tolerant Systems," *Proc. of the 20<sup>th</sup> IEEE Int. Symp. on Fault-Tolerant Computing (FTCS-20)*, New Castle Upon Tyne, England, June, 1990, pp. 499-504.
29. Geist, R., and Reynolds, R., "Colored Noise Inversion in Digital Halftoning," *Proc. of Graphics Interface '90 (GI '90)*, Halifax, Nova Scotia, May, 1990, pp. 31-38.
30. Smotherman, M., and Geist, R., "Phased Mission Effectiveness Using a Nonhomogeneous Markov Reward Model," *Reliability Engineering and System Safety*, **27**(1990), pp. 241-255.
31. Geist, R., and Reynolds, R., "The Most Likely Steady State for Large Numbers of Stochastic Traveling Salesmen," *Proc. of the First Int. Workshop on Numerical Solution of Markov Chains*, Raleigh, North Carolina, January, 1990, pp. 569-581; also appears in: *Numerical Solution of Markov Chains*, W. Stewart ed., Marcel Dekker, New York, 1991, Chapter 28, pp. 529-541.

32. Geist, R., Smotherman, M., and Brown, M., "Ultrahigh Reliability Estimates for Systems Exhibiting Globally Time-Dependent Failure Processes," *Proc. of the 19<sup>th</sup> IEEE Int. Symp. on Fault-Tolerant Computing (FTCS-19)*, Chicago, Illinois, June, 1989, pp. 152-158.
33. Geist, R., Reynolds, R., and Westall, J., "Selection of a Checkpoint Interval in a Critical Task Environment," *IEEE Trans. on Reliab.*, **37** (1988) pp. 395-400.
34. Geist, R., Smotherman, M., Trivedi, K., and Dugan, J., "The Use of Weibull Fault Processes in Modeling Fault Tolerant Systems," *AIAA Journal of Guidance, Control, and Dynamics*, **11** (1988), pp. 91-93.
35. Geist, R. M., and Daniel, S. W., "A Continuum of Disk Scheduling Algorithms," *ACM Trans. on Comp. Sys.*, **5** (1987), pp. 77-92. (See also: review by S. Chanson, *ACM Computing Reviews*, 28 (1987).)
36. Atkins, J., and Geist, R. M., "Fibonacci Numbers and Computer Algorithms," *The College Mathematics Journal*, **18** (1987), pp. 328-336.
37. Geist, R., Reynolds, R., and Pittard, E., "Disk Scheduling in System V," *Proc. of the ACM SIGMETRICS Conf. on Measurement and Modeling of Computer Systems*, Banff, Alberta, May, 1987, pp. 59-68.
38. Geist, R., Allen, R., and Nowaczyk, R., "Towards a Model of User Perception of Computer System Response Time," *Proc. of the ACM SIGCHI Conf. on Human Factors in Computing Systems (CHI + GI '87)*, Toronto, Ontario, April, 1987, pp. 249-253.
39. Geist, R., Stevenson, D., and Allen, R., "The Perceived Effect of Breakdown and Repair on the Performance of Multiprocessor Systems," *Performance Evaluation*, **6** (1986), pp. 249-260.
40. Geist, R., Smotherman, M., Trivedi, K., and Dugan, J., "The Reliability of Life-Critical Computer Systems," *Acta Informatica*, **23** (1986), pp. 621-642.
41. Dugan, J., Trivedi, K., Smotherman, M., and Geist, R., "The Hybrid Automated Reliability Predictor," *AIAA Journal of Guidance, Control, and Dynamics*, **9** (1986), pp. 319-331.
42. Smotherman, M., Geist, R., and Trivedi, K., "Provably Conservative Approximations to Complex Reliability Models," *IEEE Trans. on Comp., Special Issue on Fault-Tolerant Computing C-35* (1986), pp. 333-338.
43. Trivedi, K., Dugan, J., Geist, R., and Smotherman, M., "Hybrid Reliability Modeling of Fault-Tolerant Computer Systems," *Computers and Electrical Engineering, Special Issue on Reliability and Verification of Computing Systems*, **11** (1984), pp. 87-108. (See also: review by W. S. Lai, *ACM Computing Reviews*, 27 (1986).)
44. Wagner, R. A., and Geist, R. M., "The Crippled Queen Placement Problem," *The Science of Computer Programming*, **4** (1984), pp 221-248.
45. Geist, R. M., "How to Live to Be 100," *The College Mathematics Journal*, **15** (1984), pp. 256-263.
46. Geist, R. M., "Perception-Based Configuration Design of Computer Systems," *Information Processing Letters*, **18** (1984), pp. 55-57.

47. Dugan, J., Trivedi, K., Geist, R., and Nicola, V., "Extended Stochastic Petri Nets: Applications and Analysis," *Proc. of the 10<sup>th</sup> IFIP Int. Symposium on Computer Performance Modeling, Measurement, and Evaluation (PERFORMANCE '84)*, Paris, France, December, 1984, pp. 507-519.
48. Geist, R., Trivedi, K., Dugan, J., and Smotherman, M., "Modeling Imperfect Coverage in Fault-Tolerant Systems," *Proc. of the 14<sup>th</sup> IEEE Int. Symp. on Fault-Tolerant Computing (FTCS-14)*, Orlando, Florida, June, 1984, pp. 77-82.
49. Geist, R. M., and Trivedi, K. S., "Ultrahigh Reliability Prediction for Fault-Tolerant Computer Systems," *IEEE Trans. on Comp.*, **C-32** (1983), pp. 1118-1127.
50. Trivedi, K. S., and Geist, R. M., "Decomposition in Reliability Analysis of Fault-Tolerant Computer Systems," *IEEE Trans. on Reliab.*, **R-32** (1983), pp. 463-468.
51. Geist, R. M., and Trivedi, K. S., "The Integration of User Perception in the Heterogeneous M/M/2 Queue," *Proc. of the 9<sup>th</sup> IFIP Int. Symposium on Computer Performance Modeling, Measurement, and Evaluation (PERFORMANCE '83)*, College Park, Maryland, May, 1983, pp. 203-216.
52. Geist, R. M., and Trivedi, K. S., "Optimal Design of Multilevel Storage Hierarchies," *IEEE Trans. on Comp.*, **C-31** (1982), pp. 249-260.
53. Geist, R. M., and Trivedi, K. S., "Queueing Network Models in Computer System Design," *Mathematics Magazine*, **55** (1982), pp. 67-80.
54. Geist, R., Kraines, D., and Fink, P., "Natural Language Computing in a Linear Algebra Course," *Proc. of the National Educational Computing Conference*, Kansas City, Missouri, June, 1982, pp. 203-208.
55. Connolly, F. X., and Geist, R. M., "On Extending Free Group Actions on Spheres and a Conjecture of Iwasawa," *Trans. Amer. Math. Soc.*, **274** (1982), pp. 631-640.
56. Geist, R. M., "Semicharacteristic Detection of Obstructions to Rational Homotopy Equivalence," *General Topology and Its Applications*, **7** (1977), pp. 185-199.

**PATENT:**

- U.S. Patent #5638190, *Context Sensitive Color Quantization System and Method*, 1997.

**GRANTS (PI or co-PI):** (selected subset)

- *τέχνη: A New Approach to the B.A. Degree in Computer Science*, NSF (CISE/EIA), \$330,000, July, 2003 - July, 2007.
- *Motion Capture in Clinical Science*, Mindfield LLC, Charleston County, U.S. Dept. of Education, \$146,688, October, 2004 - September, 2005.
- *Design and Implementation of a Graphics Supercomputer from Commodity Components*, NSF (CISE/ACI/ITR), \$284,834, August, 2001 - July, 2005.

- *IBM Parallel Processing Laboratory*, IBM, eServer BladeCenter (equipment, U.S. list \$124,808), June, 2004.
- *Validated Modeling of Network Component Performance*, NSF (CISE/(I/U)CRC), \$50,000, July, 2001 - June, 2004.
- *Digital Imaging Research: Space-time Photography*, SC Commission on Higher Education, \$47,700, August, 2001 - December, 2001.
- *Graphics Benchmarking for Linux Systems*, Dell Computer Corp., \$48,875, October, 2000 - September, 2001.
- *SCINET: High Speed Connection*, NSF (CISE/ANIR), \$386,470, October, 1998 - September, 2001.
- *Modeling, Simulation, and Virtualization of Physical Phenomena*, NSF (CISE/EIA/MRI), \$500,000, August, 1997 - July, 2001.
- *Real-time Visualization of Polymer Flows*, NASA(EPSCoR), \$36,520, January, 2000 - December, 2000.
- *AViiON Systems Performance Analysis*, Data General Corporation, \$221,652, August, 1992 - December, 2000.
- *Advanced Sensing and Control Techniques to Facilitate Semi-Autonomous Decommissioning of Hazardous Sites*, U.S. Dept. of Energy, \$870,733, September, 1996 - September, 2000.
- *Virtual Servoing of Serpentine Robots for Enhanced Manipulation* NSF (EHR/EPSCoR), \$400,000, January, 1999 - July, 2000.
- *A Linux Workstation for High-Performance Graphics*, NASA Ames Research Center, \$148,056, January, 1997 - February, 2000.
- *Collaborative Vehicle Design Framework*, U.S. Army Tank Command (TACOM), \$463,157, December, 1997 - March, 1999.
- *ATM Network Support for the Linux Operating System*, IBM Corp., \$57,914, January, 1997 - December, 1997.
- *Towards a Theory of Hierarchical Modeling*, NSF (CISE/CCR), \$99,398, September, 1991 - February, 1994.
- *Software Reliability for Real-Time Control Systems*, NASA Langley Research Center, \$20,000, August, 1989 - October, 1990.
- *Sufficiency and Necessity in Reliability Modeling*, NASA Langley Research Center, \$110,000, April, 1987 - August, 1990.
- *Modeling and Analysis of Parallel Processing Systems*, Concurrent Computer Corporation, MC6700 Multiprocessor System (equipment, U.S. list \$220,000), February, 1989.
- *A Modeling Tool for Improved Product Design*, NCR Corp., \$28,581, July, 1986 - June, 1987.
- *Cost Effectiveness in Solution Techniques for HARP Models*, NASA Langley Research Center, \$18,218, October, 1985 - September, 1986.

- *Numerical Issues in the Design of the Hybrid Automated Reliability Predictor*, NASA Langley Research Center, \$22,800, October, 1984 - September, 1985.
- *Computer Systems Modeling*, Perkin-Elmer Corporation, 3230 System (equipment, U.S. list \$233,250), November, 1984.
- *Design of the Hybrid Automated Reliability Predictor*, NASA Langley Research Center, \$135,000, October, 1982 - September, 1984.
- *Evaluation of CARE III*, NASA Langley Research Center, \$39,990, January, 1981 - October, 1981.

## **EMPLOYMENT:**

- 8/87 - present: Professor of Computer Science, Clemson University
- 1/02 - 5/02: Visiting Professor of Computer Science, University of New Mexico (on sabbatical from Clemson University)
- 1/84 - 7/87: Associate Professor of Computer Science, Clemson University
- 7/83 - 12/83: Associate Professor of Computer Science, Duke University
- 1/81 - 6/83: Assistant Professor of Computer Science, Duke University
- 7/80 - 12/80: Research Associate in Computer Science, Duke University
- 8/77 - 6/80: Associate Professor of Mathematics, Pembroke State University
- 1/77 - 6/77: Visiting Assistant Professor of Mathematics, University of North Carolina at Chapel Hill (on leave from Pembroke State University)
- 9/74 - 8/77: Assistant Professor of Mathematics, Pembroke State University

## **TEACHING EXPERIENCE:**

### **Mathematics:**

Introduction to College Mathematics, College Algebra, Trigonometry, Finite Mathematics, Introduction to Statistics, Calculus (I, II, Intermediate, Advanced I, II), Point Set Theory, Linear Algebra, Probability and Statistics (I, II), Abstract Algebra (I, II), Dynamical Systems

### **Computer Science:**

Introduction to Data Processing, Introduction to Programming, Programming Methodology, Data Structures, Introduction to Operating Systems, Introduction to Computer Graphics, Advanced Modeling Techniques in Computer Graphics (graduate), Virtual Reality Systems (graduate), Mathematical Methods for Systems Analysis (I, II graduate), Systems Modeling (graduate), Operating System Design (graduate)